Mortality decrease according to socioeconomic groups: inconclusive evidence.

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The recent article by Regidor and colleagues[1] analyses the impact of the economic crisis in Spain on age-adjusted mortality rates for different socioeconomic groups. We wish to point out that the results are consistent with a hypothesis of no difference between people of different socioeconomic status groups despite the authors' conclusions.

Firstly, the economic crisis may have led people to change socioeconomic status. Household floor space and number of cars are used as proxies for socioeconomic status; the crisis may have caused households to downsize or to sell a car. The expected effect of this would be to reduce mortality rates in lower socioeconomic status groups.

Secondly, in relative terms the reduction in all-cause mortality is approximately the same between socioeconomic status groups, at around 15%. Different absolute rates may just reflect the distribution of the burden of disease.

Thirdly, in Spain average healthcare expenditure per capita in the period 2004-7 was approximately $2,300, while in the period 2008-11 it was $3,000.[2] This may explain the observed declines, especially when point two is taken into consideration.

Fourthly, a widely made statistical error is to assume that the difference between "significant" and "not significant" is itself statistically significant.[3] While within group changes are tested, no hypothesis tests are conducted to compare changes between different groups. Without these comparisons, conclusions cannot be made without running the risk of falling foul of the aforementioned error.

To make accurate inferences from observational data appropriate caution must be taken to select, test, and compare appropriate models. Without this rigour few conclusions are tenable.

References

[1] Regidor E, Vallejo F, Granados JAT, Viciana-Fernandez FJ, de la Fuente L, and Barrio G. Mortality decrease according to socioeconomic groups during the economic crisis in Spain: a cohort study of 36 million people. *Lancet*. 2016; (published online Oct 13.)http://dx.doi.org/10.1016/S0140-6736(16)30446-9.

[2] World Bank. Healthcare Expenditure per capita (current US$) Spain. http://data.worldbank.org/indicator/SH.XPD.PCAP?locations=es. (Accessed October 24th, 2016)

[3] Gelman, A and Stern, H. The Difference Between “Significant” and “Not Significant” is not Itself Statistically Significant. *The American Statistician* 2006; **60**(4): 328-31.